



The impact of gamification on students' extrinsic and intrinsic motivation

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Abstract

The purpose of this paper is to report the elements of gamification and the transposition of these elements into a classroom setting. Gamification has inspired increased motivation and engagement of players. Harnessing the elements that drive relentless efforts to succeed in the virtual world can alter the effects of students and their learning experiences. As the reality of schools changes, in rural and urban locales, so must the classroom. Consumers have been exposed to gamification for years. Students experience team quests and individual challenges to earn experience points for their guild. A quantitative research approach on this topic has provided empirical data to provide potential support for this innovative teaching method to help students engage in course material.

Keywords: Gamification, innovative teaching, motivation, engagement

1. Introduction

The significance of this research is that all students should have the opportunity to succeed. Studies have shown that motivation, relevance, and engagement improve learning and achievement in the classroom (Areepattamannil, Freeman, & Klinger, 2011; Demmert, 2011; Foley, 2012; Thomas & Brown 2011). More students need to graduate from high school. Graduation is a pre-requisite for students to attend higher learning institutions that would provide students with certifications, diplomas, and degrees that will typically provide better-paying job positions. The findings presented have the potential to improve learning achievement levels for all students.

The purpose of this paper is to acquaint the reader with the terminology of gamification, elements associated with gamification, the design principles that may be applied and the benefits of incorporating these principles into the classroom. A literature review on gamification in education is offered as well as the systematic mapping of categorical applications in education. The paper provides a quantitative analysis of data collected from college students on their experiences in a class that was gamified.

2. Background: Gamification

Over three decades ago video games were introduced, and now the ubiquity of games and game apps are part of everyday life for all ages of people. Gamification is possibly less than one decade in existence. However, the psychometric considerations of games and their value were documented by Mood and Specht in a government report. They stated, "a virtue of gaming that is sometimes overlooked by those seeking grander goals . . . is its unparalleled advantages in training and educational programs. A game can easily be made fascinating enough to put over the duller facts" (1954, p. 12-13). Testimony that even military training can be entertaining, engaging and provide learning.

Deterding, Dixon, Khaled and Nacke (2011) defined gamification as the use of game design elements in non-game contexts such as education. Lee and Hammer (2011) stated that gamification has been very successful in promoting companies and products and is reaching the domains of marketing, politics, health and fitness. Gamification is finding its way into the classroom with the potential to improve education outcomes for all students. A review of the literature on gamification in education conducted by Nah, Zeng, Telaprolu, Ayyappa and Eschenbrenner (2014) identified the design elements utilized to gamify teaching in the learning context. These design elements were: points, levels or stages, badges, leaderboards, prizes and rewards, progress bars, storyline, and feedback (Nah et al., 2014). The use of game elements is intended to inculcate students' motivation and engagement to enhance learning (Lee & Hammer, 2011).

A systematic mapping study of gamification in education revealed categories from numerous research papers provided some examples of design principles: goals and challenges, personalization, rapid

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feedback, visible status, freedom of choice, freedom to fail, and social engagement (Dicheva, Dichev, Agre & Angelova, 2015). Social engagement and visible status were reported as the most popular where students completed individual and group challenges or competitions (Dicheva et al., 2015). Most of the gamification of education was in science, engineering, information and computer technology (Dicheva et al., 2015; Nah et al., 2014).

Although Dicheva et al. (2015) provide a meta-analysis that confirmed the results were promising; more substantial empirical research was needed, and this research was to fill that gap. This research is also in the non-technology discipline of communications at the college level for business students.

3. Research Methodology

This section will explain the procedures for the participant selection and the analysis conducted with the data collected. The hypothesis is that students would perceive gamification will improve learning, engagement, extrinsic motivation and intrinsic motivation.

3.1 Participant Selection and Data Collection

The data was collected from the three cohorts of college students in one school location that had experienced a gamified classroom by the same instructor on the same communication topics. An instructor that was not involved in the gamification process administered the survey in the following term, and 45 students completed it.

The questions were structured to provide insight into students' perceptions and motivation based on the research questions. The survey consisted of three groups of questions: one for demographic purposes and the remaining two groups were to address the research questions. The research questions specifically are:

1. Do students experience increased motivation when the course incorporates gaming elements?
2. Do students perceive that they learned more from a gamification approach versus textbook instruction?
3. Do students experience intrinsic rewards by participating in a gamified classroom?
4. Do students that play games regularly enjoy the gamification process more than students that do not play games regularly?

3.2 The Process Explained

To gamify a course is daunting and an extremely labor intensive activity. How to begin is the hardest part. Reviewing the classroom techniques instituted by forerunners such as Sheldon (2012) explain the gamification process in a scientific arena. Transposing those techniques into a communications class was a huge leap. Students had the foundations of writing documents and presenting persuasive messages in the first part of the term. In the second part of the term, the learning outcomes were to provide a persuasive presentation, create working agendas, conduct meetings, and prepare minutes from the meetings. All students completed one presentation, agenda, and minutes and were graded according to a standardized rubric meeting the required learning outcomes. Each student also was placed in a leadership role as a chairperson to conduct at least one meeting. All the class assignments related to fundraising for a charity and students groups of consisted of 4-5 students.

The fundraising activity created the gamification *overlay* as student groups were competing to raise the most money for their charity. With the gamification design principle, the students set goals, had the same challenge – to fundraise; this also allowed for personalization of what activity was used to raise money. Students would earn experience points (XP) for attendance and various challenges in addition to prizes and awards. Peer pressure increased attendance, and groups received extra bonus points and rewards. A leaderboard was updated every class so students would visually compare their group, individual status, and XP levels against their peers. Students were also aware of the standings (point accumulation) of the students in the other cohorts.

4. The Findings

Once the gamification began, a dramatic change occurred. The early morning classes where attendance was low dramatically improved as students would cheer as they saw the final classmate of their group arrive. Full group attendance meant bonus points. While students were holding meetings and discussing ideas the energy in the classroom was elevated. Also, the social engagement of the students was



enhanced. Students were voluntarily meeting before school, at lunch and after school to discuss ideas, hold meetings, gather donations or fundraise for their charity. The survey used a Likert scale with rankings of 1 to 5 with 1 representing Strongly Disagree and 5 representing Strongly Agree. The questions were crafted to address the research questions presented earlier in this paper.

4.1 Demographics

Of the 45 respondents, 80% were between the ages of 18 to 25, 11% were between the ages of 26 and 30, and the remaining 9% were over 31 years of age. The sampling consisted of 69% Caucasian and 31% self-identified Aboriginal students.

4.2 Motivation

The motivation to attend class would potentially stem from the bonus points offered in the gamification process and the overall competition and points collected. The leaderboard and the amount of money generated by each group would improve motivation. The responses to the survey questions regarding students not wanting to miss the class and not wanting to let down their teammates provided a 71.1% and 86.6% response rate respectively in the Strongly Agree and Agree (SA+A) categories. Students SA+A that the class was more engaging than their other classes at a rate of 42.2%. When asked if they spent time outside of the classroom was also deemed to be an activity that represented motivation at a rate of 66.7% that SA+A. Students confirmed that they enjoyed the competition against the other teams at a rate of 66.6% SA+A.

4.3 Students learned more from gamification

The perception that students learned more from the gamification approach is challenging to separate from the project-based challenge to raise money for their charity. Focusing on the questions that referred to the fundraising as a practical way to learn scored 68.9% and students felt they learned more from the process of the project than from a textbook scored 73.3% SA+A. The students SA+A at a rate of 64.4% that they enjoyed the class because the theory was put into practice and was a better way to learn.

4.4 Intrinsically rewarding

It is challenging to separate the altruistic nature of the project and charity fundraising from the scores collected. The students reported a high sense of pride in raising money for charity at a score of 82.2% SA+A. A question more focused on the competition and gamification, the students reported that they enjoyed the competition against the other teams at a rate of 64.6% and felt gaining points for their team was fun at a rate of 40%. Students did report that they find games exciting and fun to participate in at a rate of 42.2% that SA+A.

4.5 Regular game players more drawn to a gamification approach

The survey found that few students reported that they played games online 17.8%, or on the phone at 28.9%. The survey reported that 75.5% of students disagreed and strongly disagreed that they played games regularly. With 45 respondents, 80% were between the ages of 18 to 25.

5. Conclusion

More research on gamification in education is needed to substantiate the effects of gamification on students. The initial offerings of this research imply that gamification could increase motivation.

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